Factoid

Contrary to what Freud believed, it's possible to change nightmares with psychotherapy. Imagery rehearsal therapy combats nightmares by rehearsing—thinking and imagining—a new more positive dream at different times during the day. Compared with people in a control group, many people who write down the new dream and rehearse it every day report sharp reductions in the frequency of their nightmares (Krakow et al., 2001).

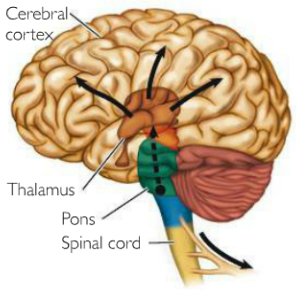


FIGURE 5.4 Activation-Synthesis Theory. According to activation-synthesis theory, the pons transmits random signals to the thalamus, which relays information to the forebrain of the cerebral cortex. The forebrain in turn attempts to create a story from the incomplete information it receives.

Activation–Synthesis Theory

Starting in the 1960s and 1970s, Alan Hobson and Robert McCarley developed **activation–synthesis theory** (Hobson & McCarley, 1977; Hobson, Pace-Schott, & Stickgold, 2000), which proposes that dreams reflect brain activation in sleep, rather than repressed unconscious wishes, as Freud claimed. Far from having deep, universal meaning, Hobson and McCarley maintained that dreams reflect the activated brain's attempt to make sense of random and internally generated neural signals during REM sleep.

Throughout the day and night, the balance of neurotransmitters in the brain shifts continually. REM is turned on by surges of the neurotransmitter acetylcholine, as the neurotransmitters serotonin and norepinephrine are shut down. Acetylcholine activates nerve cells in the pons, located at the base of the brain (see Chapter 3), while dwindling levels of serotonin and norepinephrine decrease reflective thought, reasoning, attention, and memory. The activated pons sends incomplete signals to the thalamus, which as we learned in Chapter 3 is a relay station for sensory information, to the language and visual areas of the forebrain, as shown in **FIGURE 5.4**. That's the activation part of the theory. The forebrain does its best to cobble together the signals it receives into a meaningful story. That's the synthesis part of the theory. Nevertheless, the bits of information it receives are haphazard and chaotic, so the narrative is rarely coherent or logical. The amygdala is also ramped up, adding the emotional colors of fear, anxiety, anger, sadness, and elation to the mix (see Chapters 3 and 11). According to activation–synthesis theory, the net result of these complex brain changes is what we experience as a dream, which may bear slim to no relation to our everyday lives.

If dreams mirrored our life circumstances, as most other dream theories propose, we'd expect the dreams of people with disabilities to be very different from those of individuals with no disabilities. But when Hobson and his colleagues (Voss, Tuin, Schermelleh-Engel, & Hobson, 2009) examined the dreams of people who were either deaf-mute or paraplegic from the time of birth, they found that the form and content of their dreams were no different from the dreams of people without disabilities. Clearly, as activation–synthesis theory predicts, dreams often take on a life of their own, far removed from everyday reality.

Dreaming and the Forebrain

RULING OUT RIVAL HYPOTHESES ▶
Have important alternative explanations for the findings been excluded?

An alternative to the activation–synthesis theory emphasizes the role of the forebrain in dreaming. Mark Solms (1997; Solms & Turnbull, 2002) surveyed 332 cases of patients with brain damage from stroke, tumors, and injury. From this gold mine of data, he determined that damage to the parietal lobes and to the deep frontal white matter—which connects different parts of the cortex to the lower parts of the brain—can lead to a complete loss of dreaming. It's likely that the damaged brain areas are pathways that allow brain centers involved in dreaming to communicate. When they're disconnected, dreaming stops.

FALSIFIABILITY ▶
Can the claim be disproved?

Thus, damage to the forebrain can eliminate dreams entirely, even when the brain stem is working properly. This finding seems to refute the claim of activation–synthesis theory that the brain stem plays an exclusive role in producing dreams and underscores the role of the forebrain in dreaming. According to Solms, dreams are driven largely by the motivational and emotional control centers of the forebrain as the logical "executive" parts of the brain snooze.

activation–synthesis theory
theory that dreams reflect inputs from brain activation originating in the pons, which the forebrain then attempts to weave into a story

Answers are located at the end of the text.

DREAM INTERPRETATIONS — evaluating CLAIMS

We all dream, and many of us are curious about what, if anything, our dreams mean. According to many popular websites and books, our dreams are trying to tell us something through their symbols. Let's evaluate some of these claims, which are modeled after actual dream interpretation books and websites.

"Your dreams are *hidden messages* sent from your subconscious to help guide your life."

Is there extraordinary evidence to support this extraordinary claim? In fact, most dream reports are straightforward descriptions of everyday activities and problems rather than hidden or disguised messages.

"*Seeing a coconut in your dreams means* that you will receive an unexpected sum of money."

Scientific evidence doesn't support the claim that specific symbols in our dreams possess a deeper meaning or predict something in our lives. Many dreams have no special meaning at all, and some dreams reflect everyday preoccupations.

"Using the *ancient art of dream analysis*, we can uncover hidden meanings in your dreams."

Does the fact that dream interpretations have been around a long time mean they're valid?

Neurocognitive Perspectives on Dreaming

Scientists who've advanced a **neurocognitive theory** of dreaming argue that explaining dreams only in terms of neurotransmitters and random neural impulses doesn't tell the full story. Instead, they contend, dreams are a meaningful product of our cognitive capacities, which shape what we dream about. For example, children under the age of 7 or 8 recall dreaming on only 20 to 30 percent of occasions when awakened from REM sleep compared with 80 to 90 percent of adults (Foulkes, 1982, 1999). Until they reach the age of 9 or 10, children's dreams tend to be simple, lacking in movement, and apart from an occasional nightmare, less emotional and bizarre than adult dreams (Domhoff, 1996). A typical 5-year-old's dream may be of a pet or animal in a zoo. According to the neurocognitive perspective, complex dreams are cognitive achievements that parallel the gradual development of visual imagination and other advanced cognitive abilities. We begin to dream like adults when our brains develop the "wiring" to do so (Domhoff, 2001a).

According to the neurocognitive perspective, the fact that dreams are often rather ordinary and dramatize concerns that are important to us when we're not in slumberland implies that they reflect more than random neural impulses generated by the brain stem (Domhoff, 2011; Foulkes, 1985; Revonsuo, 2000). Content analyses of tens of thousands of adult dreams (Hall & Van de Castle, 1966) reveal that many are associated with everyday activities, emotional concerns, and preoccupations (Domhoff, 1996; Hall & Nordby, 1972;

neurocognitive theory
theory that dreams are a meaningful product of our cognitive capacities, which shape what we dream about

Smith & Hall, 1964), including playing sports, preparing for tests, feeling self-conscious about our appearance, and being single (Pano, Hilscher, & Cupchik, 2008–2009). Moreover, dream content is surprisingly stable over long time periods. In a journal containing 904 dreams that a woman kept for more than five decades, six themes (eating or thinking of food, the loss of an object, going to the toilet, being in a small or messy room, missing a bus or train, doing something with her mother) accounted for more than three-fourths of the contents of her dreams (Domhoff, 1993). Additionally, 50 to 80 percent of people report recurrent dreams, like missing a test, over many years (Cartwright & Romanek, 1978; Zadra, 1996).

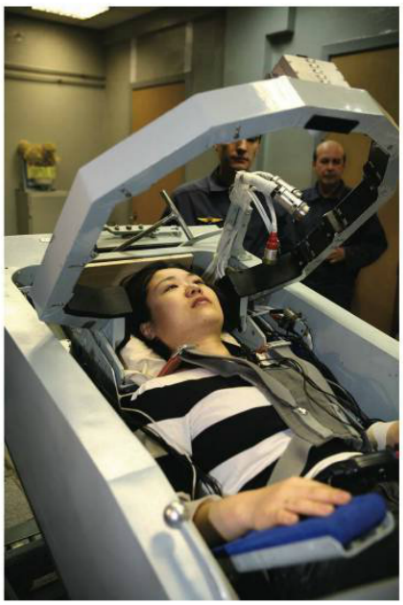
As we've seen, there are sharp disagreements among scientists about the role of the brain stem and REM sleep, and the role that development plays in dreaming. Nevertheless, scientists generally agree that (1) acetylcholine turns on REM sleep and (2) the forebrain plays an important role in dreams.

Study and Review in MyPsychLab

Assess Your Knowledge **FACT or FICTION?**

1. Dreams often reflect unfulfilled wishes, as Freud suggested. **True / False**
2. Activation–synthesis theory proposes that dreams result from incomplete neural signals generated by the pons. **True / False**
3. REM sleep is triggered by the neurotransmitter acetylcholine. **True / False**
4. Damage to the forebrain can eliminate dreams. **True / False**
5. Recurrent dreams are extremely rare. **True / False**

Answers: 1. F (p. 179); 2. T (p. 180); 3. T (p. 180); 4. T (p. 180); 5. F (p. 182)



When astronauts train for missions in whirling centrifuge devices that force oxygen enriched blood out of their brains as they accelerate, some experience vivid hallucinations (Birbaumer et. al., 2005).

Other Alterations of Consciousness and Unusual Experiences

5.6 Determine how scientists explain unusual and seemingly "mystical" alterations in consciousness.

5.7 Distinguish myths from realities concerning hypnosis.

As the stages of sleep demonstrate, consciousness is far more complicated than just "conscious" versus "unconscious." Moreover, there are other variations on the theme of consciousness besides sleep and waking. Some of the more radical alterations in consciousness include hallucinations, as well as out-of-body, near-death, and déjà vu experiences.

Hallucinations: Experiencing What Isn't There

Hallucinations, ranging from seeing ghost-like apparitions or scenes of splendid beauty, to hearing voices in the head commanding people to engage in unspeakable acts of violence, to feeling bugs marching on the skin, can seem amazingly real. Hallucinations are realistic perceptual experiences in the absence of any external stimuli, and they can occur in any sensory modality. Brain scans reveal that when people report visual hallucinations, their visual cortex becomes active, just as it does when they see a real object (Allen et al., 2008; Bentall, in press). The same correspondence holds true for other senses, like hearing and touch, underscoring the link between our perceptual experiences and brain activity.

A frequent misconception is that hallucinations occur only in psychologically disturbed individuals (Aleman & Laroi, 2008). Yet surveys reveal that between 10 and 14 percent (Tien, 1991) to as many as 39 percent (Ohayon, 2000; Posey & Losch, 1983) of college students and people in the general population report having hallucinated during the day at least once—even when not taking drugs or experiencing psychological problems (Ohayon, 2000). Some non-Western cultures, including some in Africa, value hallucinations as gifts of wisdom from the gods and incorporate them into their religious rituals. People in these societies may even go out of their way to induce hallucinations by means of prayer, fasting, and hallucinogenic drugs (Al-Issa, 1995; Bourguignon, 1970).

Visual hallucinations can also be brought about by oxygen and sensory deprivation, epilepsy, fever, dementia, and migraine headaches (Manford & Andermann, 1998). Auditory hallucinations (those involving sound) can occur when patients mistakenly attribute their thoughts, or inner speech, to an external source (Bentall, 1990, in press; Frith, 1992; see Chapter 15). The auditory verbal hallucinations of psychotic and well-functioning nonpsychotic individuals are similar in many respects. But they differ in that the voices that psychotic individuals hear are much more negative and perceived to be less controllable (Daalman et al., 2010).

People who float in lukewarm saltwater in dark and silent sensory deprivation tanks, hallucinate to compensate for the lack of sensory stimulation (Smith, 2009).

Out-of-Body and Near-Death Experiences

Carlos Alvarado (2000) described a 36-year-old police officer's account of an **out-of-body experience (OBE)**, an extraordinary sense of her consciousness leaving her body, when she pursued an armed suspect on her first night on patrol. "When I and three other officers stopped the vehicle and started getting (to) the suspect . . . I was afraid. I promptly went out of my body and up into the air maybe 20 feet above the scene. I remained there, extremely calm, while I watched the entire procedure—including myself—do exactly what I had been trained to do." Alvarado reported that "[s]uddenly, [she] found herself back in her body after the suspect had been subdued" (p. 183).

OBEs are surprisingly common: About 25 percent of college students and 10 percent of the general population report having experienced one or more of them (Alvarado, 2000). In many cases, individuals describe themselves as floating above their bodies, calmly observing themselves from above, implying that our sense of ourselves need not be subjectively locked into our bodies (Smith, 2009). People who are prone to OBEs frequently report other unusual experiences, including vivid fantasies, lucid dreams, hallucinations, perceptual distortions, and strange body sensations in everyday life (Blackmore, 1984, 1986). Some people also experience OBEs when they're medicated, using psychedelic drugs, experiencing migraine headaches or seizures, or either extremely relaxed or under extreme stress.

As real as an out-of-body experience seems to the person having it, research has found no evidence that consciousness exists outside the body.

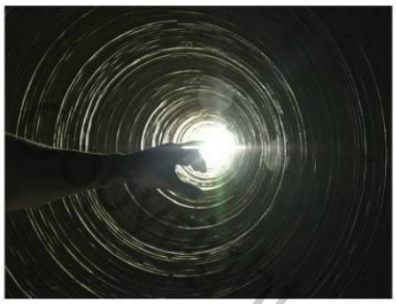
Yet are people really able to roam outside their bodies during an OBE? Laboratory studies have compared what's reported during an OBE against sights and sounds known to be present in a given location, like a hidden ledge 10 feet above a bed. Interestingly, even though many participants report they can see or hear what's occurring at a distant place, their reports are generally inaccurate or, at best, a "good guess" when they are accurate. When researchers have reported positive results, these results have virtually never been replicated (Alvarado, 2000). So there's no good evidence that people are truly floating above their bodies during an OBE, although it certainly seems that way to them (Cheyne & Girard, 2009). These findings appear to falsify the claim that people genuinely emerge from their bodies during OBEs.

◀ **REPLICABILITY**
Can the results be duplicated in other studies?

◀ **FALSIFIABILITY**
Can the claim be disproved?

What, then, are some possible explanations for these dramatic changes in consciousness? Our sense of self depends on a complex interplay of sensory information. Research suggests that when our senses of touch and vision are scrambled, the result is a disruption of our experience of our physical body with striking similarities to an OBE (Ehrsson, 2007; Lenggenhager et al., 2007). The "club drug," ketamine (widely known as "Special K"), which users often report produces bizarre out-of-body experiences and feelings of detachment from the physical world, disrupts patterns of brain activity

out-of-body experience (OBE)
sense of our consciousness leaving our body



Although there are many variations of a "near-death experience," most people in our culture believe it involves moving through a tunnel and toward a white light.

that bring about a unified sense of the self and body by reducing transmission of the neurotransmitter glutamate (Wilkins, Girard, & Cheyne, 2011). OBEs remind us that one of the human brain's great achievements is its ability to integrate sensory information from different pathways into a unified experience (see Chapter 4). Yet when this ability is disrupted, it can trick us into thinking our physical selves are separate from our bodies (Cheyne & Girard, 2009; Terhune, 2009).

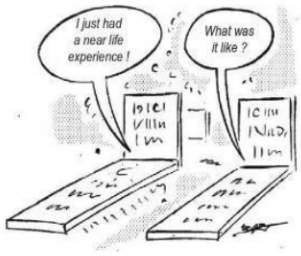
OBEs also sometimes occur in **near-death experiences (NDEs)** reported by people who've nearly died or thought they were going to die. In fact, about one quarter of patients with NDEs experience their consciousness outside their bodies (van Lommel et al., 2001). Ever since Raymond Moody (1975) cataloged them over 30 years ago, Americans have become familiar with the classical elements of the NDE that are widely circulated in books and movies—passing through a dark tunnel; experiencing a white light as a spiritual being, such as a deceased loved one or angel; the life review (seeing our lives pass before our eyes); and meeting spiritual beings or long-dead relatives, all before "coming back into the body" (see **TABLE 5.2**). Not all reports of NDEs follow this exact script, but most are close, as the case that follows illustrates. Dr. Elizabeth Kübler-Ross (1973) reported the tale of a man who was critically injured by a large truck and then observed the accident scene from above his body. He then saw his family, surrounded by an aura of light. Experiencing the family's wondrous, unconditional love, he decided to return to his body to share his experiences with others.

Roughly 6 to 33 percent of people who've been close to death report NDEs (Blanke & Dieguez, 2009; Greyson, in press; Ring, 1984; Sabom, 1982; van Lommel et al., 2001). NDEs differ across persons and cultures, suggesting they don't provide a genuine glimpse of the afterlife, but are constructed from prevalent beliefs about the hereafter in response to the threat of death (Ehrenwald, 1974; Noyes & Kletti, 1976). People from Christian and Buddhist cultures frequently report the sensation of moving through a tunnel, but native people in North America, the Pacific Islands, and Australia rarely do (Kellehear, 1993).

EXTRAORDINARY CLAIMS ▶
Is the evidence as strong as the claim?

RULING OUT RIVAL HYPOTHESES ▶
Have important alternative explanations for the findings been excluded?

It's tempting to believe that NDEs prove that when we die we'll all be ushered into the afterlife by friends or loved ones. Nevertheless, the evidence is insufficient to support this extraordinary claim. Scientists have offered alternative explanations for NDEs based on changes in the chemistry of the brain associated with cardiac arrest, anesthesia, and other physical traumas (Blackmore, 1993). For example, a feeling of complete peace that can accompany an NDE may result from the massive release of *endorphins* in a dying brain, and buzzing, ringing, or other unusual sounds may be the rumblings of an oxygen-starved brain (Blackmore, 1993; see Chapter 3).



(© www.CartoonStock.com)

near-death experience (NDE)
experience reported by people who've nearly died or thought they were going to die

TABLE 5.2 Common Elements in Adult Near-Death Experiences.

- Difficulty describing the experience in words
- Hearing ourselves pronounced dead
- Feelings of peace and quiet
- Hearing unusual noises
- Meeting "spiritual beings"
- Experiencing a bright light as a "being of light"
- Panoramic "life review," that is, seeing our entire life pass before our eyes
- Experiencing a realm in which all knowledge exists
- Experiencing cities of light
- Experiencing a realm of ghosts and spirits
- Sensing a border or limit
- Coming back "into the body"

(*Based on:* Greyson, 2000; Moody, 1975, 1977)

Moreover, many, if not all, of the experiences associated with NDEs occur in circumstances in which people don't face imminent death. For example, NDE-like experiences can be triggered by (a) electrical stimulation of the brain's temporal lobes (Persinger, 1994); (b) lack of oxygen to the brain in rapid acceleration during fighter pilot training (Whinnery, 1997); and (c) psychedelic (such as LSD and mescaline) and anesthetic (such as ketamine) drugs (Jansen, 1991). Until more definitive evidence is marshaled to demonstrate that NDEs reflect anything more than changes in physiology in the dying brain, there seems to be no reason to discard this more parsimonious explanation for NDEs (Lynn et al., 2010).

◀ **OCCAM'S RAZOR**
Does a simpler explanation fit the data just as well?

from inquiry to understanding

WHY DO WE EXPERIENCE DÉJÀ VU?

Have you ever been talking to a friend and noticed that the conversation and surroundings seemed strangely familiar? Or traveled somewhere new and felt like you've been there before? When your text's author first visited his undergraduate alma mater, Cornell University, he had the unmistakable feeling of having seen the campus even though he'd never been there before. If you've had one or more of these eerie 10–30 second flashes of familiarity, you've experienced **déjà vu**, which is French for "already seen." More than two-thirds of us have experienced at least one episode of déjà vu (Adachi et al., 2008). How can we explain the origins of déjà vu?

Although some have proposed that the déjà vu experience is a memory from a past life, this explanation is unfalsifiable and therefore outside the boundaries of science (Stevenson, 1960). Research conducted in the field of biopsychology offers more promising clues. An excess of the neurotransmitter dopamine in the temporal lobes may play a role in déjà vu (Taiminen & Jääskeläinen, 2001). In addition, people who experience small seizures in the right temporal lobe, which is largely responsible for feelings of familiarity, sometimes experience déjà vu right before a seizure (Bancaud et al., 1994). Other work on rodents raises the possiblity that closely interconnected brain areas that normally allow organisms to distinguish between two similar physical contexts may occasionally fail to communicate, perhaps explaining déjà vu experiences in humans (McHugh et al., 2007). Yet until recently, the hallmark of these fleeting illusions—the simultaneous sense of newness and familiarity—has not been well understood or studied under carefully controlled laboratory conditions.

A team of researchers recently used virtual reality technology to test the hypothesis that déjà vu arises when a present experience resembles an earlier one. Their research was guided by the idea that the sense of familiarity occurs when we don't consciously recall the previous experience. Perhaps we've driven by a park many times without ever noticing it, but our minds processed the information unconsciously (Strayer, Drews, & Johnston, 2003). So when we drive by the park some time later, it's "déjà vu all over again."

Anne Cleary and her colleagues (Cleary et al., 2012) outfitted participants with a head-mounted display that gave the impression they were immersed inside a 3-dimensional scene. Participants could turn their heads left or right, or look up or down to view the scene from different angles and perspectives. Cleary asked them to report whether they experienced déjà vu while viewing the scene, and defined déjà vu for participants as, "A feeling of having been somewhere or done something before, despite knowing that the current situation is new" (p. 972). According to the researchers' familiarity hypothesis, déjà vu arises when the arrangement of elements within a scene maps onto an arrangement previously seen, but the previous scene fails to come to mind. When participants viewed a novel scene whose key elements were arranged in a similar manner to a previously-viewed scene, such as a bedroom or a bowling alley, but failed to recall that scene, they reported higher familiarity ratings and more frequent déjà vu than for completely novel scenes. The more the new scenes resembled the previously viewed scenes, the more often they reported déjà vu.

◀ **FALSIFIABILITY**
Can the claim be disproved?

(© Chris Slane)

déjà vu
feeling of reliving an experience that's new

The researchers concluded that the matching of features of the scenes produces familiarity and déjà vu when participants can't recall the previous scene.

This conclusion may fit with findings that people who are frequently travelers often experience déjà vu (Brown, 2003, 2004a), because they have many opportunities to encounter similar scenes in different places. Still, Cleary and co-authors' fascinating research leaves open the question of why certain people, especially those who are young and politically liberal (Brown, 2004a), are prone to déjà vu. Some of the mysteries of déjà vu remain to be solved.

Factoid

Some people experience a phenomenon called *jamais vu*, French for "never seen," which is essentially the opposite of déjà vu. In *jamais vu*, the person reports feeling as though a previously familiar experience suddenly seems unfamiliar. *Jamais vu* is sometimes seen in neurological disorders, such as amnesia and epilepsy (Brown, 2004) (see Chapter 7).

Mystical Experiences

A 30-year-old male who was listening to the rock band ABBA described a profound mystical experience in this way. He imagined gazing at a star-studded night sky; suddenly, his consciousness, not his physical body, started to travel up toward the stars. While he no longer paid attention to the music, even though it continued to play, he experienced his consciousness accelerating and expanding at a tremendous rate into the cosmos before finally returning to his body (Mystical Experience Registry, 2012).

Mystical experiences, like those reported by this lover of ABBA's music, can last for only a few moments yet often leave lasting, even lifelong, impressions. These experiences, although often difficult to put into words, often involve a sense of unity or oneness with the world, transcendence of time and space, and feelings of wonder and awe. These phenomena often have strong spiritual overtones and may have contributed to the formation of many world religions and have been reported through the ages in association with prayer, fasting, meditation, and social isolation (Wulff, in press). Yet they differ across religious faiths. Christians often describe mystical experiences in terms of an awe-inspiring merging with God's presence. In contrast, Buddhists, whose spiritual practices focus more on achieving personal enlightenment than worship of a deity, often describe mystical incidents in terms of bliss and selfless peace. Although shaped by learning and culture, each person's mystical experience is probably unique. As many as 35 percent of Americans say they've felt very close to a powerful, uplifting spiritual force at least once (Greeley, 1975).

Because intense mystical experiences are rare, unpredictable, and often fleeting, they're difficult to study in the laboratory (Wulff, in press). Nevertheless, scientists have recently begun to probe their mysteries. One approach is to induce mystical experiences and examine their consequences. Adopting this approach, researchers used fMRI to scan the brains of 15 Roman Catholic nuns after asking them to close their eyes and relive the most intense mystical occurrence they'd ever experienced (Beauregard & Paquette, 2006). They also instructed them to relive the most intense state of union with another human they'd felt as a nun. Compared with a condition in which the nuns sat quietly with eyes closed and the condition in which the nuns relived the interpersonal experience, the "mystical experiences" condition produced distinctive patterns of brain activation. In fact, at least 12 areas of the brain associated with emotion, perception, and cognition became active when the nuns relived mystical experiences. We can question whether the researchers actually captured mystical experiences. Reliving an experience in the laboratory may differ from more spontaneous mystical events produced by fasting, prayer, fevers, seizures in the temporal lobes, or meditation (Geschwind, 1983; Persinger, 1987).

In the second approach, neuroscientists (Griffiths et al., 2008; Griffiths et al., 2011) asked 36 participants without any personal or family history of mental illness to ingest psilocybin, a hallucinogenic drug that affects serotonin receptors and is the active ingredient in the sacred mushroom, used for centuries in religious ceremonies. At follow-up 14 months later, 58 percent of participants who ingested psilocybin reported a mystical experience they claimed was one of the most meaningful events of their lives. Additionally, about two thirds of the participants rated the experience as one of their top five most spiritually significant moments and reported increases in life satisfaction. The percentages of mystical and positive experiences were much lower among participants

mystical experience
feelings of unity or oneness with the world, often with strong spiritual overtones

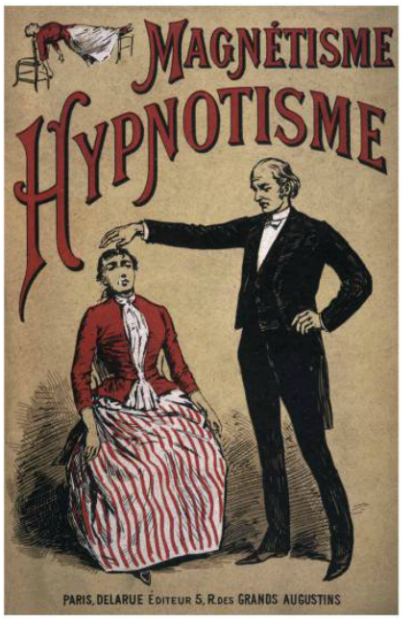
who ingested a placebo. People who ingested psilocybin also reported increases in their ability to be open to experience (MacLean et al., 2012). In another study (Grob et al., 2011), patients with advanced cancer reported improvements in mood and anxiety following psilocybin that lasted for three months. Still, we should keep in mind that even with tightly controlled and emotionally supportive experimental procedures in place, some participants (31%, Griffiths et al, 2008) reported extreme fears and paranoia during the session, whereas in the placebo condition, none reported such fears. This research offers a glimpse of the promise of studying mystical experiences in the laboratory, while reminding us that caution is called for in using hallucinogenic drugs that can induce negative as well as positive feelings.

Hypnosis

Hypnosis is a set of techniques that provides people with suggestions for alterations in their perceptions and sensations, thoughts, feelings, memories, and behaviors (Kirsch & Lynn, 1998). To increase people's suggestibility, most hypnotists use an *induction method*, which typically includes suggestions for relaxation, calmness, and well-being, along with instructions to imagine or think about pleasant experiences (Kirsch, 1994). When suggestions are self-administered, the procedures are called self-hypnosis.

Once regarded as largely pseudoscientific, hypnosis has moved into the mainstream of science and clinical practice. Based on reliable and valid scales, scientists have established that approximately 15 to 20 percent of people pass very few (0–3 out of 12) suggestions (low suggestibles); another 15 to 20 percent pass 9–12 of the suggestions (high suggestibles); and the remaining 60 to 70 percent pass 5–8 suggestions (medium suggestibles).

Hypnosis enjoys a wide range of clinical applications. Studies show that hypnosis enhances the effectiveness of cognitive-behavioral psychotherapies (Kirsch, 1990; Kirsch, Montgomery, & Sapirstein, 1995), which we'll discuss in Chapter 16. Hypnosis is also useful for treating pain, medical conditions, obesity, anxiety, and habit disorders (such as smoking addiction; Lynn, Rhue, & Kirsch, 2011) (see **FIGURE 5.5**). Nevertheless, the extent to which the benefits associated with hypnosis in these cases are attributable to something unique to hypnosis itself, as opposed to relaxation or enhanced expectancies for improvement, remains unclear. Because there's no evidence that hypnosis is an effective treatment by itself, we should be skeptical of professional "hypnotherapists" (many of whom we can find in our local Yellow Pages or the Internet who use nothing but hypnosis to treat serious psychological problems).



Hypnosis has fascinated scientists and clinical practitioners for more than two centuries, yet the basic methods for inducing hypnosis have changed little over the years.

Watch in **MyPsychLab** the **Video:** Thinking Like a Psychologist: The Uses and Limitations of Hypnosis

RULING OUT RIVAL HYPOTHESES
Have important alternative explanations for the findings been excluded?

FIGURE 5.5 Anti-Smoking Ad. Many advertisements for the effectiveness of hypnosis in treating smoking are misleading and exaggerated. Still, hypnosis can sometimes be combined with well-established treatment approaches as a cost-effective means of helping some people quit smoking.

MYTHS AND FACTS ABOUT HYPNOSIS: WHAT HYPNOSIS ISN'T AND WHAT IT IS Despite the increasingly warm embrace of hypnosis by the professional community, public knowledge about hypnosis hasn't kept pace with scientific developments. We'll first examine six misconceptions about hypnosis and correct them with scientifically-based evidence. Then, we'll evaluate two prominent theories of how hypnosis works.

Myth and Fact 1: Hypnosis Produces a Trance State in Which "Amazing" Things Happen. Consider a sampling of movies that portray the hypnotic trance state as so overpowering that otherwise normal people will: (a) commit suicide (*The Garden Murders*); (b) disfigure themselves with scalding water (*The Hypnotic Eye*); (c) assist in blackmail (*On Her Majesty's Secret Service*); (d) perceive only a person's internal beauty (*Shallow Hal*); (e) experience total bliss (*Office Space*), (f) steal (*Curse of the Jade Scorpion*); and our favorite, (g) fall victim to brainwashing by alien preachers using messages in sermons (*Invasion of the Space Preachers*).

hypnosis
set of techniques that provides people with suggestions for alterations in their perceptions, thoughts, feelings, and behaviors

This classic picture of a person suspended between two chairs illustrates the "human plank phenomenon," often demonstrated at stage hypnosis shows as "proof" of the special powers of hypnosis. In actuality, people who stiffen their bodies can do this without hypnosis; however, we don't recommend you try it. If the chairs aren't placed properly, the person can be injured.

Other popular stereotypes of hypnosis derive from *stage hypnosis* shows, in which hypnotists seemingly program people to enact commands ranging from quacking like a duck to playing a wicked air guitar to the music of U2. But the wacky actions of people in movies and onstage have nothing to do with a trance state. In stage shows, the hypnotist carefully selects potential performers by observing how they respond to waking imaginative suggestions, which are highly correlated with how people respond to hypnotic suggestions (Braffman & Kirsch, 1999). Those whose outstretched hands drop or sag when asked to imagine holding a heavy dictionary are likely to be invited onstage because they're probably highly suggestible to begin with. Moreover, "hypnotized" volunteers often feel compelled to do outlandish things because they're under intense pressure to entertain the audience. Some stage hypnotists even whisper instructions to volunteers to get people to comply and make it a lively show ("When I snap my fingers, bark like a dog": Meeker & Barber, 1971). What's more, some of the tricks we see in stage hypnosis shows, like suspending volunteers between the tops of two chairs, are easily duplicated in highly motivated participants without hypnosis.

Actually, hypnosis doesn't have a great impact on suggestibility. A person who responds to six out of 12 suggestions without being hypnotized might respond to seven or eight after hypnosis (Kirsch & Lynn, 1995). In addition, people can resist and even oppose hypnotic suggestions at will (Lynn, Rhue, & Weekes, 1990). So, Hollywood thrillers aside, hypnosis can't turn a mild-mannered person into a mindless robot or cold-blooded murderer.

People who perform in stage hypnosis shows are carefully selected before the performance for high suggestibility.

RULING OUT RIVAL HYPOTHESES ▶
Have important alternative explanations for the findings been excluded?

Myth and Fact 2: Hypnotic Phenomena Are Unique. Scientists haven't yet identified any unique physiological states or markers of hypnosis (Dixon & Laurence, 1992; Hasegawa & Jamieson, 2002; Sarbin & Slagle, 1979; Wagstaff, 1998). Still, Kallio and colleagues (2011) recently claimed to have found evidence that the "hypnotic stare" is a unique marker of the trance state supposedly associated with hypnosis. The researchers tested a single highly hypnotizable participant whose eyes appeared to be wide and glassy during hypnosis, much like those of hypnotized participants portrayed in movies. What intrigued the researchers was that this participant did not show typical automatic eye movements in response to visual stimuli presented during hypnosis, and participants low in hypnotizability who tried to fake being hypnotized could not duplicate this feat. The problem in drawing conclusions from this study is that the result is based on only one participant, so it's questionable whether other highly suggestible people would respond similarly. The researchers might have done little more than identified a person who displays highly unusual responses to visual stimuli regardless of whether she was hypnotized. In fact, contrary to popular belief, people can experience many hypnotic phenomena, such as hallucinations and pain insensitivity, when they receive suggestions alone, even without hypnosis (Barber, 1969; Sarbin & Coe, 1979; Spanos, 1986, 1991).

Myth and Fact 3: Hypnosis Is a Sleeplike State. James Braid (1843), a Scottish physician, claimed that the hypnotized brain produces a condition akin to sleep. Braid labeled the phenomenon *neurohypnosis* (from the Greek word hypno, meaning "sleep"), and the shortened term "hypnosis" eventually stuck. Yet people who are hypnotized don't show brain waves similar to those of sleep. What's more, people are just as responsive to hypnotic suggestions administered while exercising on a stationary bicycle as they are following hypnotic suggestions for sleep and relaxation (Bányai & Hilgard, 1976; Wark, 2006).

Myth and Fact 4: Hypnotized People Are Unaware of Their Surroundings. Another popular idea is that hypnotized people are so entranced that they lose touch with their surroundings. Actually, most hypnotized people are fully aware of their immediate surroundings and can even recall the details of a telephone conversation they overheard during hypnosis (Lynn, Weekes, & Milano, 1989).

Myth and Fact 5: Hypnotized People Forget What Happened during Hypnosis. In the 1962 film *The Manchurian Candidate,* remade in 2004, a person is programmed by hypnosis to commit an assassination and has no memory of what occurred during hypnosis. In real life, *spontaneous amnesia* for what happens during hypnosis is rare and mostly limited to people who expect to be amnesic following hypnosis (Simon & Salzberg, 1985; Young & Cooper, 1972).

Hypnotists frequently present participants with the suggestion that one of their arms is lifting involuntarily.

Myth 6: Hypnosis Enhances Memory. In 1976 in Chowchilla, California, three young men intent on committing the "perfect crime" kidnapped 26 children and their bus driver (see Chapter 7). The blundering criminals didn't expect their captives to escape after being hidden underground for six hours. After police apprehended the criminals, the bus driver was hypnotized and correctly provided numbers from the license plate of the kidnappers' car. The media used this now famous case to publicize the power of hypnosis to enhance recall. The problem is that the anecdote doesn't tell us whether hypnosis was responsible for what the driver remembered. Perhaps the driver recalled the event because people often can remember additional details when they try to recall an event a second time, regardless of whether they're hypnotized.

◀ **RULING OUT RIVAL HYPOTHESES**
Have important alternative explanations for the findings been excluded?

Moreover, the media tend not to report the scores of cases in which hypnosis fails to enhance memory, such as a Brinks armored car robbery that took place in Boston (Kihlstrom, 1987). In this case, the witness was hypnotized and confidently recalled the license plate of the car of the president of Harvard University, where the witness was employed. Apparently, he confused a car he'd seen multiple times with the car involved in the robbery.

Scientific studies generally reveal that hypnosis doesn't improve memory (Erdelyi, 1994; Mazzoni, Heap, & Scoboria, 2010). Hypnosis does increase the amount of information we recall, but much of it is inaccurate (Erdelyi, 1994; Steblay & Bothwell, 1994; Wagstaff, 2008). To make matters worse, hypnosis tends to increase eyewitnesses' confidence in inaccurate, as well as accurate, memories (Green & Lynn, 2005). Indeed, courts in most U.S. states have banned the testimony of hypnotized witnesses out of concerns that their inaccurate statements will sway a jury and lead to wrongful convictions.

THEORIES OF HYPNOSIS. Researchers have attempted to explain hypnosis in terms of unconscious drives and motivations, a willingness to overlook logical inconsistencies, enhanced receptivity to suggestion, and an inhibition of the brain's frontal lobes (Lynn & Rhue; 1991; Nash & Barnier, 2008; Sheehan & McConkey, 1986). Each of these theories has contributed valuable insights into hypnotic phenomena. Nevertheless, two other models, the sociocognitive theory and the dissociation theory, have received the lion's share of attention.

Sociocognitive Theory. Sociocognitive theorists (Barber, 1969; Coe & Sarbin, 1991; Lynn, Kirsch, & Hallquist, 2008; Spanos, 1986) reject the idea that hypnosis is a trance state or unique state of consciousness. Instead, they explain hypnosis in the same way they explain everyday social behaviors. According to **sociocognitive theory**, people's attitudes, beliefs, motivations, and expectations about hypnosis, as well as their ability to respond to waking imaginative suggestions, shape their responses to hypnosis.

sociocognitive theory
approach to explaining hypnosis based on people's attitudes, beliefs, expectations, and responsiveness to waking suggestions

Consistent with sociocognitive theory, peoples' expectations of whether they'll respond to hypnotic suggestions are correlated with how they respond (Kirsch & Council, 1992). Still, this correlation doesn't necessarily mean that people's expectations cause them to be susceptible to hypnosis. Studies in which participants' responses vary

◀ **CORRELATION VS. CAUSATION**
Can we be sure that A causes B?